

CLAIMS

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1. Method for the joining of bodies (41, 50, 51, 65, 66) by means of thermally melting a joining element (1, 20, 30, 52, 67, 75, 80) **characterised in** that the joining element (1, 20, 30, 52, 67, 75, 80) by means of a directed force (F) acts on a surface (4, 40, 59) of at least one of the bodies (41, 50, 51, 65, 66), penetrates the surface as a result of the directed force (F), and that once the surface has been penetrated a mechanical excitation is generated in such a manner, that during a further penetration of the joining element (1, 20, 30, 52, 67, 75, 80) into the at least one body (41, 50, 51, 65, 66) the advance movement is maintained through the directed force (F) and the melting down is maintained through the mechanical excitation, so that molten material is hydraulically displaceable into the surroundings.
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2. Method in accordance with claim 1, **characterised in** that the mechanical excitation is applied after a predetermined depth of penetration of the joining element (1, 20, 30, 52, 67, 75, 80) into one of the bodies (41, 50, 51, 65, 66) has been achieved and/or after a predetermined load level of the directed force (F) has been reached.
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3. Method according to claim 2, **characterised in** that the mechanical excitation takes place by means of ultrasound.
4. Method in accordance with claim 2, **characterised in** that the mechanical excitation takes place by means of rotation.

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5. Method according to claim 1, **characterised in** that a secondary movement is superimposed on the penetration of the joining element (1, 20, 30, 52, 67, 75, 80) into one of the bodies (41, 50, 51, 65, 66), which assists the penetration.
6. Method in accordance with claim 5, **characterised in** that the secondary movement represents a rotation.
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7. Method according to claim 1, **characterised in** that at least two bodies (41, 50, 51, 65, 66) are joined by means of a joining element (1, 20, 30, 52, 67, 75, 80).
8. Method in accordance with claim 7, **characterised in** that between the common surfaces (59, 60) of the bodies to be joined (41, 50, 51, 65, 66) an additional layer made out of a meltable material is present, which as a result of the mechanical excitation melts and assists, resp., seals the mechanical joint between the bodies (41, 50, 51, 65, 66).
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9. Method according to claim 7, **characterised in** that one of the bodies (41, 50, 51, 65, 66) comprises a bore (53) for receiving a joining element (52).
10. Method in accordance with claim 1, **characterised in** that at least one of the bodies to be joined (41, 50, 51, 65, 66) consists of porous material.
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11. Joining element (1, 20, 30, 52, 67, 75, 80) for utilisation in the method according to claim 1, **characterised in** that the joining element (1, 20, 30, 52, 67, 75, 80) consists of thermo-plastic plastic material.

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12. Joining element (1, 20, 30, 52, 67, 75, 80) in accordance with claim 11, **characterised in** that the joining element (1, 20, 30, 52, 67, 75, 80) is manufactured by means of injection moulding.
13. Joining element (1, 20, 30, 52, 67, 75, 80) in accordance with claim 11, **characterised in** that the thermo-plastic plastic material comprises additives, which reduce the internal mechanical damping.
- 5 14. Joining element (1, 20, 30, 52, 67, 75, 80) in accordance with claim 11, **characterised in** that the thermo-plastic plastic material comprises additives, which increase the mechanical strength.
- 10 15. Joining element (1, 20, 30, 52, 67, 75, 80) according to claim 13 and/or 14, **characterised in** that the additives consist of lime powder, carbon fibres, glass fibres, aramide fibres, wood dust or ceramic material or of a mixture of these materials.
- 15 16. Joining element (1, 20, 30, 52, 67, 75, 80) in accordance with one of the claims 11 to 15, **characterised in** that the joining element (1, 20, 30, 52, 67, 75, 80) comprises direction-giving elements for energy (70).
17. Joining element (1, 20, 30, 52, 67, 75, 80) according to one of the claims 11 to 16, **characterised in** that the joining element (1, 20, 30, 52, 67, 75, 80) is a component part of a hinge.
- 20 18. Joining element (1, 20, 30, 52, 67, 75, 80) in accordance with one of the claims 11 to 16, **characterised in** that the joining element (1, 20, 30, 52, 67, 75, 80) serves to receive a fixing element or a hinge.

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^{19.} Joint manufactured according to the method in accordance with one of the claims 1 to 10 with one or several joining elements according to one of the claims 11 to 18, **characterised in that** molten material of a joining element (1, 20, 30, 52, 67, 75, 80) is hardened within the structure of a body (41, 50, 51, 65, 66).

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